MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
Gaithersburg, Maryland 20899

SRM Number: 2646a
MSDS Number: 2646a
SRM Name: Propane in Nitrogen
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SECTION I. MATERIAL IDENTIFICATION

Material Name: Propane in Nitrogen

Description: This SRM is supplied in a DOT 3AL specification aluminum (6061 alloy) cylinder with a water volume of 6 L. Mixtures are shipped with a nominal pressure exceeding 12.4 MPa (1800 psi) which provides the user with 0.73 m^3 (25.8 ft^3) of useable mixture. The cylinder conforms to DOT specifications and is equipped with a CGA-350 brass valve which is the recommended outlet for this propane mixture.

Other Designations: Propane (dimethylmethane; *n*-propane; propyl hydride) in **Nitrogen**

Name	Chemical Formula	CAS Registry Number
Propane	C_3H_8	74-98-7
Nitrogen	N_2	7727-37-9

DOT Classification: Nonflammable Gas UN1956 (This gas mixture is classified as nonflammable due to the small concentration of propane; nitrogen is nonflammable.)

Manufacturer/Supplier: Available from a number of suppliers

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration	Limits and Toxicity Data
Propane	1000 µmol/mol	OSHA-PEL: 1000 mg/kg or 1800 mg/m^3
		ACGIH-TLV: 2500 mg/kg
		Guinea pig, Inhalation: LC_{50}: > 5.5 % (2 h)
Nitrogen	balance	No ACGIH-TLV established (Simple Asphyxiant)

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Nitrogen
Appearance and Odor: colorless, odorless, tasteless gas
Relative Molecular Mass: 28.01
Density: 1.2506 g/L
Boiling Point: -196 °C
Melting Point: -210 °C
Boiling Point: not applicable
Solubility in Water: 1.6 g/100 mL @ 20 °C
Solubility in Other Compounds: soluble in liquid ammonia; slightly soluble in alcohol

NOTE: Physical and chemical data on this gas mixture do not exist. The data provided is for pure nitrogen. This material contains propane at a concentration below the reportable limit (0.1 % for carcinogens, 1 % for all other health hazards) required by OSHA according to 29 CFR 1910.1200 (g)(2)(i)(c)(1).

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: nonflammable **Autoignition Temperature:** not applicable

Flammability Limits in Air (Volume %): UPPER: not applicable
LOWER: not applicable

Extinguishing Media: Use extinguishing media that is appropriate to the surrounding fire.

Special Fire Procedures: Fire fighters should wear full protective clothing and self-contained breathing apparatus when this material is involved in a fire. Keep fire cylinders cool with water spray. If possible, stop the product flow.

Unusual Fire and Explosion Hazards: Nonflammable Gas: Concentrations of propane equal to or less than 6.5 % in nitrogen are considered nonflammable (CGA Pamphlet P-23, 1995). The lower explosive limit (LEL) for propane in air is 2.1 %. Cylinder may rupture or explode from pressure when involved in a fire situation.

SECTION V. REACTIVITY DATA

Stability: **X** **Stable** ____ **Unstable**

Conditions to Avoid: Avoid conditions that support combustion and excessive temperatures; cylinder temperature should not exceed 49 °C.

Incompatibility (Materials to Avoid): Nitrogen is relatively inert but may react with oxygen and hydrogen upon sparking, calcium, strontium, and barium with red heat, carbon in the presence of alkalis or barium oxide, and lithium to produce toxic compounds. Propane is incompatible with strong oxidizers.

See Section IV: *Fire and Explosion Hazard Data*

Hazardous Decomposition or Byproducts: Propane can produce carbon monoxide and carbon dioxide.

Hazardous Polymerization: _____ **Will Occur** **X** **Will Not Occur**

SECTION VI. HEALTH HAZARD DATA

Route of Entry: **X** **Inhalation** **X** **Skin** ____ **Ingestion**

Health Hazards (Acute and Chronic): At high concentrations, product may have a narcotic effect or act as an asphyxiant displacing oxygen necessary to support life. Effects of oxygen deficiency resulting from simple asphyxiants may include rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgment, depression of all sensations, emotional instability, and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma, and death. Propane may cause central nervous system (CNS) depression at high concentrations. Oxygen levels above 19.5 % should be maintained. Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

Medical Conditions Generally Aggravated by Exposure: None known

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		X
In the International Agency for Research on Cancer (IARC) Monographs		X
By the Occupational Safety and Health Administration (OSHA)		X

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Rinse affected area with copious amounts of water for at least 15 min. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 min. Obtain medical assistance if necessary.

Inhalation: Prompt medical attention is mandatory in all cases of overexposure. Rescue personnel should be equipped with self-contained breathing apparatus. Immediately move victim to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

Ingestion: Not applicable

TARGET ORGAN(S) OF ATTACK: central nervous system (CNS)

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released: Notify safety personnel of major leaks. Minor leaks, which are dangerous in enclosed areas, can be detected by painting the suspected area of leakage with a soap solution; bubbling indicates a leak. Evacuate the area and keep personnel upwind. Emergency personnel should wear full protective equipment. Remove leaking cylinder to exhaust hood or safe outdoors area. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs.

Waste Disposal: DO NOT reuse the empty cylinder. The empty cylinder will contain residue. Follow proper federal, state, and local regulations.

Handling and Storage: Wear appropriate NIOSH approved respirator, chemical resistant gloves, insulated gloves and other protective clothing. **Warning:** *Air-purifying* respirators will not protect workers in an oxygen-deficient atmosphere. Use only in well ventilated areas. Use a suitable hand truck for cylinder movement. Safety shoes are recommended for those handling cylinders of gases. Safety shower and eye bath should be readily available.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Store cylinder in a cool, dry, well-ventilated area. Cylinder temperature should not exceed 49 °C. Use only with equipment rated for cylinder pressure. Close valve when not in use and when cylinder is empty. Make sure cylinder is properly secured to prevent falling.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Source: BOC Gases, MSDS G-129, Propane (≤ 6.5 %) in Nitrogen Gas Mixture, 11 August 1998.
MDL Information Systems, MSDS *Nitrogen, Compressed Gas*, 2 June 1999.

Disclaimer: Physical and chemical data contained in this MSDS are provided for use in assessing the hazardous nature of the material. The MSDS was prepared carefully using current references; however, NIST does not certify the data on the MSDS. The certified values for this material are given only on the NIST Certificate of Analysis.